AMENDMENTS TO THE CLAIMS

Please **CANCEL** claims 1, 5, 10, 11, 15, and 20 without prejudice or disclaimer.

Please **AMEND** claims 2, 4, 6, 8, 9, 12, 14, 16, 18, and 19 as shown below.

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Canceled)

2. (Currently Amended) An optical disk unit having reproducer for reproducing information recorded in an information recording layer of an optical disk, comprising:

a laser beam source;

an aberration corrector to correct a spherical aberration by adjusting the diverging or converging angle of a laser beam emitted from the laser beam source;

an objective lens to condense the laser beam and form a condensed beam spot on the information recording layer;

a focus controller having a moving mechanism to move the objective lens along an optical axis of the laser beam, the focus controller moving the objective lens so that the condensed beam spot focuses on the information recording layer;

a detector capable of allowing the focus controller to move the objective lens by a predetermined distance from an in-focus position in a first direction, allowing the reproducer to reproduce a random signal having a plurality of amplitudes and periods from an area of the information recording layer, extracting a specific portion having a specific amplitude or period

from the reproduced random signal or an interpolated signal thereof, finding a first amplitude value in the specific portion, allowing the focus controller to move the objective lens by the predetermined distance from the in-focus position in a second direction that is opposite to the first direction, allowing the reproducer to reproduce a random signal having a plurality of amplitudes and periods from the area of the information recording layer, extracting a specific portion having a specific amplitude or period from the reproduced random signal or an interpolated signal thereof, and finding a second amplitude value from the specific portion;

a control unit capable of controlling the aberration corrector so that the difference between the first amplitude value and the second amplitude value approaches zero; ~~The optical disk unit as set forth in claim 1, further comprising:~~

a determiner capable of determining whether or not the information recording layer has a record to reproduce a random signal by the detector; and

a recorder capable of recording a random signal having a plurality of amplitudes and periods in the area of the information recording layer if the detector determines that the information recording layer has no record to reproduce a random signal by the detector.

3. (Previously Presented) The optical disk unit as set forth in claim 2, wherein:
the area is an OPC area.

4. (Currently Amended) The optical disk unit as set forth in claim [[1]]2, wherein:

the detector is an envelope detector to detect envelopes in the specific portions and find the first and second amplitude values.

5. (Canceled)

6. (Currently Amended) An optical disk unit having a reproducer for reproducing information recorded in an information recording layer of an optical disk, comprising:

a laser beam source;

an aberration corrector to correct a spherical aberration by adjusting the diverging or converging angle of a laser beam emitted from the laser beam source;

an objective lens to condense the laser beam and form a condensed beam spot on the information recording layer;

a focus controller having a moving mechanism to move the objective lens along an optical axis of the laser beam, the focus controller moving the objective lens so that the condensed beam spot focuses on the information recording layer;

a detector for allowing the focus controller to move the objective lens by a predetermined distance from an in-focus position in a first direction, allowing the reproducer to reproduce a random signal having a plurality of amplitudes and periods from an area of the information recording layer, extracting a first specific portion having a first specific amplitude or period and a second specific portion having a second specific amplitude or period from the reproduced random signal or an interpolated signal thereof, finding a first differential value between an

amplitude value of the first specific portion and an amplitude value of the second specific portion, allowing the focus controller to move the objective lens by the predetermined distance from the in-focus position in a second direction that is opposite to the first direction, allowing the reproducer to reproduce a random signal having a plurality of amplitudes and periods from the optional area of the information recording layer, extracting a third specific portion having a third specific amplitude or period and a fourth specific portion having a fourth specific amplitude or period from the reproduced random signal or an interpolated signal thereof, and finding a second differential value between an amplitude value of the third specific portion and an amplitude value of the fourth specific portion;

a control unit capable of controlling the aberration corrector so that the difference between the first differential value and the second differential value approaches zero; ~~The optical disk unit as set forth in claim 5, further comprising:~~

a determiner capable of determining whether or not the information recording layer has a record to reproduce a random signal by the detector; and

a recorder capable of recording a random signal having a plurality of amplitudes and periods in the area of the information recording layer if the determiner determines that the information recording layer has no record to reproduce a random signal by the detector.

7. (Previously Presented) The optical disk unit as set forth in claim 6, wherein:

the area is an OPC area.

8. (Currently Amended) An optical disk unit having a reproducer for reproducing information recorded in an information recording layer of an optical disk, comprising:

a laser beam source;

an aberration corrector to correct a spherical aberration by adjusting the diverging or converging angle of a laser beam emitted from the laser beam source;

an objective lens to condense the laser beam and form a condensed beam spot on the information recording layer;

a focus controller having a moving mechanism to move the objective lens along an optical axis of the laser beam, the focus controller moving the objective lens so that the condensed beam spot focuses on the information recording layer;

a detector for allowing the focus controller to move the objective lens by a predetermined distance from an in-focus position in a first direction, allowing the reproducer to reproduce a random signal having a plurality of amplitudes and periods from an area of the information recording layer, extracting a first specific portion having a first specific amplitude or period and a second specific portion having a second specific amplitude or period from the reproduced random signal or an interpolated signal thereof, finding a first differential value between an amplitude value of the first specific portion and an amplitude value of the second specific portion, allowing the focus controller to move the objective lens by the predetermined distance from the in-focus position in a second direction that is opposite to the first direction, allowing the reproducer to reproduce a random signal having a plurality of amplitudes and periods from the optional area of the information recording layer, extracting a third specific portion having a third

specific amplitude or period and a fourth specific portion having a fourth specific amplitude or period from the reproduced random signal or an interpolated signal thereof, and finding a second differential value between an amplitude value of the third specific portion and an amplitude value of the fourth specific portion; and

a control unit capable of controlling the aberration corrector so that the difference between the first differential value and the second differential value approaches zero, ~~The optical disk unit as set forth in claim 5,~~ wherein the detector comprises:

a zero-cross detector capable of detecting a zero-cross point where the reproduced random signal or an interpolated signal thereof crosses a preset zero level;

a time interval detector capable of detecting a time interval between two adjacent zero-cross points; and

an extractor capable of extracting the first to fourth specific portions according to time intervals detected by the time interval detector.

9. (Currently Amended) An optical disk unit having a reproducer for reproducing information recorded in an information recording layer of an optical disk, comprising:

a laser beam source;

an aberration corrector to correct a spherical aberration by adjusting the diverging or converging angle of a laser beam emitted from the laser beam source;

an objective lens to condense the laser beam and form a condensed beam spot on the information recording layer;

a focus controller having a moving mechanism to move the objective lens along an optical axis of the laser beam, the focus controller moving the objective lens so that the condensed beam spot focuses on the information recording layer;

a detector for allowing the focus controller to move the objective lens by a predetermined distance from an in-focus position in a first direction, allowing the reproducer to reproduce a random signal having a plurality of amplitudes and periods from an area of the information recording layer, extracting a first specific portion having a first specific amplitude or period and a second specific portion having a second specific amplitude or period from the reproduced random signal or an interpolated signal thereof, finding a first differential value between an amplitude value of the first specific portion and an amplitude value of the second specific portion, allowing the focus controller to move the objective lens by the predetermined distance from the in-focus position in a second direction that is opposite to the first direction, allowing the reproducer to reproduce a random signal having a plurality of amplitudes and periods from the optional area of the information recording layer, extracting a third specific portion having a third specific amplitude or period and a fourth specific portion having a fourth specific amplitude or period from the reproduced random signal or an interpolated signal thereof, and finding a second differential value between an amplitude value of the third specific portion and an amplitude value of the fourth specific portion; and

a control unit capable of controlling the aberration corrector so that the difference between the first differential value and the second differential value approaches zero, ~~The optical disk unit as set forth in claim 5,~~ wherein the detector comprises:

a zero-cross detector capable of detecting a zero-cross point where the reproduced random signal or an interpolated signal thereof crosses a preset zero level;

a partial response determiner capable of using zero-cross points detected by the zero-cross detector and the reproduced random signal or an interpolated signal thereof, to determine a target value for each sampling point of the reproduced random signal or an interpolated signal thereof according to run-length limitation and state transition determined by partial response characteristics; and

an extractor capable of extracting the first to fourth specific portions according to target values determined by the partial response determiner.

10-11. (Canceled)

12. (Currently Amended) An aberration correcting method used for an optical disk unit, comprising:

a reproducing step of reproducing a random signal having a plurality of amplitudes and periods from an optional area of an information recording layer of an optical disk;

a focusing step of moving an objective lens along an optical axis, to condense a laser beam emitted from a laser beam source on the information recording layer and focus the condensed beam spot on the information recording layer;

a first detecting step of moving the objective lens by a predetermined distance from the in-focus position set in the focusing step in a first optical axis direction, reproducing the random

signal, extracting a specific portion having a specific amplitude or period from the reproduced random signal or an interpolated signal thereof, and finding a first amplitude value in the specific portion;

a second detecting step of moving the objective lens by the predetermined distance from the in-focus position set in the focusing step in a second direction that is opposite to the first direction, reproducing the random signal, extracting a specific portion having a specific amplitude or period from the reproduced random signal or an interpolated signal thereof, and finding a second amplitude value in the specific portion; and

a controlling step of controlling an aberration corrector that corrects a spherical aberration by adjusting the diverging or converging angle of the laser beam, so that the difference between the first amplitude value and the second amplitude value approaches zero,

~~The~~ the aberration correcting method ~~used for an optical disk unit as set forth in claim 11,~~ further comprising before the reproducing step:

a determining step of determining whether or not the information recording layer has a record to reproduce a random signal in the first and second detecting steps; and

a recording step of recording a random signal having a plurality of amplitudes and periods in the area of the information recording layer if the determining step determines that the information recording layer has no record to reproduce a random signal in the first and second detecting steps.

13. (Previously Presented) The aberration correcting method used for an optical disk unit as set forth in claim 12, wherein:

the area is an OPC area.

14. (Currently Amended) The aberration correcting method used for an optical disk unit as set forth in claim [[11]]12, wherein:

the first and second detecting steps are envelope detecting steps of detecting envelopes in the specific portions and finding the first and second amplitude values.

15. (Canceled)

16. (Currently Amended) An aberration correcting method used for an optical disk unit, comprising:

a reproducing step of reproducing a random signal having a plurality of amplitudes and periods from an area of an information recording layer of an optical disk;

a focusing step of moving an objective lens along an optical axis, to condense a laser beam emitted from a laser beam source on the information recording layer and focus the condensed beam spot on the information recording layer;

a first detecting step of moving the objective lens by a predetermined distance from the in-focus position set in the focusing step in a first optical axis direction, reproducing the random signal, extracting a first specific portion having a first specific amplitude or period and a second

specific portion having a second specific amplitude or period from the reproduced random signal or an interpolated signal thereof, and finding a first differential value between an amplitude value of the first specific portion and an amplitude value of the second specific portion;

a second detecting step of moving the objective lens by the predetermined distance from the in-focus position set in the focusing step in a second direction that is opposite to the first direction, reproducing the random signal, extracting a third specific portion having a third specific amplitude or period and a fourth specific portion having a fourth specific amplitude or period from the reproduced random signal or an interpolated signal thereof, and finding a second differential value between an amplitude value of the third specific portion and an amplitude value of the fourth specific portion; and

a controlling step of controlling an aberration corrector that corrects a spherical aberration by adjusting the diverging or converging angle of the laser beam, so that the difference between the first differential value and the second differential value approaches zero,

~~The~~ the aberration correcting method ~~used for an optical disk unit as set forth in claim 15,~~ further comprising before the reproducing step:

a determining step of determining whether or not the information recording layer has a record to reproduce a random signal in the first and second detecting steps; and

a recording step of recording a random signal having a plurality of amplitudes and periods in the area of the information recording layer if the determining step determines that the information recording layer has no record to reproduce a random signal in the first and second detecting steps.

17. (Previously Presented) The aberration correcting method used for an optical disk unit as set forth in claim 16, wherein: the area is an OPC area.

18. (Currently Amended) An aberration correcting method used for an optical disk unit, comprising:

a reproducing step of reproducing a random signal having a plurality of amplitudes and periods from an area of an information recording layer of an optical disk;

a focusing step of moving an objective lens along an optical axis, to condense a laser beam emitted from a laser beam source on the information recording layer and focus the condensed beam spot on the information recording layer;

a first detecting step of moving the objective lens by a predetermined distance from the in-focus position set in the focusing step in a first optical axis direction, reproducing the random signal, extracting a first specific portion having a first specific amplitude or period and a second specific portion having a second specific amplitude or period from the reproduced random signal or an interpolated signal thereof, and finding a first differential value between an amplitude value of the first specific portion and an amplitude value of the second specific portion;

a second detecting step of moving the objective lens by the predetermined distance from the in-focus position set in the focusing step in a second direction that is opposite to the first direction, reproducing the random signal, extracting a third specific portion having a third specific amplitude or period and a fourth specific portion having a fourth specific amplitude or

period from the reproduced random signal or an interpolated signal thereof, and finding a second differential value between an amplitude value of the third specific portion and an amplitude value of the fourth specific portion; and

a controlling step of controlling an aberration corrector that corrects a spherical aberration by adjusting the diverging or converging angle of the laser beam, so that the difference between the first differential value and the second differential value approaches zero, ~~The aberration correcting method used for an optical disk unit as set forth in claim 15,~~ wherein the first and second detecting steps include:

a zero-cross detecting step of detecting a zero-cross point where the reproduced random signal or an interpolated signal thereof crosses a preset zero level;

a time interval detecting step of detecting a time interval between two adjacent zero-cross points; and

an extracting step of extracting the first to fourth specific portions according to time intervals detected in the time interval detecting step.

19. (Currently Amended) An aberration correcting method used for an optical disk unit, comprising:

a reproducing step of reproducing a random signal having a plurality of amplitudes and periods from an area of an information recording layer of an optical disk;

a focusing step of moving an objective lens along an optical axis, to condense a laser beam emitted from a laser beam source on the information recording layer and focus the condensed beam spot on the information recording layer;

a first detecting step of moving the objective lens by a predetermined distance from the in-focus position set in the focusing step in a first optical axis direction, reproducing the random signal, extracting a first specific portion having a first specific amplitude or period and a second specific portion having a second specific amplitude or period from the reproduced random signal or an interpolated signal thereof, and finding a first differential value between an amplitude value of the first specific portion and an amplitude value of the second specific portion;

a second detecting step of moving the objective lens by the predetermined distance from the in-focus position set in the focusing step in a second direction that is opposite to the first direction, reproducing the random signal, extracting a third specific portion having a third specific amplitude or period and a fourth specific portion having a fourth specific amplitude or period from the reproduced random signal or an interpolated signal thereof, and finding a second differential value between an amplitude value of the third specific portion and an amplitude value of the fourth specific portion; and

a controlling step of controlling an aberration corrector that corrects a spherical aberration by adjusting the diverging or converging angle of the laser beam, so that the difference between the first differential value and the second differential value approaches zero, ~~The aberration correcting method used for an optical disk unit as set forth in claim 15,~~ wherein the first and second detecting steps include:

a zero-cross detecting step of detecting a zero-cross point where the reproduced random signal or an interpolated signal thereof crosses a preset zero level;

a partial response determining step of using zero-cross points detected in the zero-cross detecting step and the reproduced random signal or an interpolated signal thereof and determining a target value for a sampling point of the reproduced random signal or an interpolated signal thereof according to run-length limitation and state transition determined by partial response characteristics; and

an extracting step of extracting the first to fourth specific portions according to target values determined in the partial response determining step.

20. (Canceled)